

# COUNTRY MEADOWS SUBDIVISION (3140200) SOURCE WATER ASSESSMENT REPORT

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May 17, 2004



## State of Idaho Department of Environmental Quality

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## Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of this designated assessment area, sensitivity factors associated with the wells, and aquifer characteristics.

This report, *Source Water Assessment for Country Meadows Subdivision*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, e.g. nitrates, arsenic), volatile organic contaminants (VOCs, e.g. petroleum products), synthetic organic contaminants (SOCs, e.g. pesticides), and microbial contaminants (e.g. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

The Country Meadows Subdivision drinking water system consists of one well. Water chemistry tests at the wellhead have shown no significant problems. Water chemistry tests are routinely conducted on the Country Meadows Subdivision drinking water system. No contaminants have been detected in the drinking water system. Nitrate concentrations have been detected in the samples collected but at levels far below the maximum contaminant levels (MCLs). Total coliform bacteria have not been detected in the distribution system. No VOCs, SOCs, or microbial contamination has been detected in the wells. However, the county level agricultural chemical use, nitrogen fertilizer usage, and herbicide usage all ranked high. In addition, the delineation crosses an organics priority area for the pesticides atrazine and alachlor. In terms of total susceptibility, the Country Meadows Subdivision ranked moderate for SOCs, IOCs, VOCs, and microbial contamination.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the Country Meadows Subdivision, drinking water protection activities should focus on maintaining the requirements of the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system’s components and its capacity). Any

spills from the potential contaminant sources listed in Table 1 of this report should be carefully monitored, as should any future development in the delineated areas. Other drinking water protection activities should focus on implementation of practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas. Most of the designated areas are outside the direct jurisdiction of the Country Meadows Subdivision. Partnerships with state and local agencies and industry groups should be established and are critical to success.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations are near urban and residential land use areas. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. There are transportation corridors near the delineations, therefore the State Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission and Gem Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community with a fully developed drinking water protection program will incorporate many strategies. For assistance in developing protection strategies please contact the Boise Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

# SOURCE WATER ASSESSMENT FOR COUNTRY MEADOWS SUBDIVISION, NAMPA, IDAHO

## Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop this assessment is also attached.

### Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments for sources active prior to 1999 were completed by May of 2003. SWAs for sources activated post-1999 are being developed on a case-by-case basis. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

## **Section 2. Conducting the Assessment**

### **General Description of the Source Water Quality**

The Country Meadows Subdivision, near Nampa, Idaho is a community system serving 35 residents through 18 connections, located in Canyon County, in the Treasure Valley approximately two miles east of the city of Nampa (Figure 1). The public drinking water system for Country Meadows Subdivision is comprised of one well.

No significant water chemistry problems have been recorded in the well water, though the possibility of contamination from agricultural uses remains high. The Country Meadows Subdivision drinking water system consists of one well. Water chemistry tests at the wellhead have shown no significant problems. Water chemistry tests are routinely conducted on the Country Meadows Subdivision drinking water system. No contaminants have been detected in the drinking water system. Nitrate concentrations have been detected in the samples collected but at levels far below the maximum contaminant levels (MCLs). Total coliform bacteria have not been detected in the distribution system. No VOCs, SOCs, or microbial contamination has been detected in the wells. However, the county level agricultural chemical use, nitrogen fertilizer usage, and herbicide usage all ranked high. In addition, the delineation crosses an organics priority area for the pesticides atrazine and alachlor. In terms of total susceptibility, the Country Meadows Subdivision ranked moderate for SOCs, IOC, VOCs, and microbial contamination.

### **Defining the Zones of Contribution – Delineation**

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ used information compiled by BARR Engineering to perform the delineations using a combination of MODFLOW and a refined analytical element computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Boise Valley aquifer in the vicinity of the Country Meadows Subdivision. The computer models used site specific data, assimilated by BARR Engineering and DEQ from a variety of sources including the Country Meadows Subdivision well log, other local area well logs, the Treasure Valley Hydrologic Project, and hydrogeologic reports (detailed below).

## Hydrogeology

The “Treasure Valley” is a geopolitical region that includes the lower Boise River sub-basin. The lower Boise River sub-basin begins where the Boise River exits the mountains near the Lucky Peak Reservoir. From Lucky Peak Dam the lower Boise River flows about 64 (river) miles northwestward through the Treasure Valley to its confluence with the Snake River. The Treasure Valley Hydrologic Project area encompasses the lower Boise River area, and extends south to the Snake River. The southern area is included in the study area because of ground water flow from the Lower Boise River basin south toward the Snake River.

Significant amounts of desert area were converted to flood irrigated agriculture beginning in the 1860s. Irrigation led to increases in shallow ground water levels in some areas. The shallow groundwater levels provided an inexpensive and readily obtainable water supply that is used extensively throughout the valley. Much of the population growth in the Treasure Valley has been occurring in previously flood-irrigated agricultural areas, resulting in increased pumpage and a reduction in local aquifer recharge. In addition, irrigation in some areas has become more efficient, reducing the amount of irrigation-related infiltration. Decreasing aquifer recharge and increasing pumpage is thought to be contributing to decreasing ground water levels in some areas.

The Treasure Valley experiences a temperate and arid-to-semiarid climate. Average high temperatures range from about 90°F in summer to 36°F in winter; low temperatures range from about 20 °F in winter to about 56°F in summer. The average precipitation ranges from about 8 to 14 inches throughout most of the valley, most of which falls during the colder months.

Major surface water bodies include the Boise River, Lake Lowell, and Lucky Peak Reservoir. The primary source of surface water in the Treasure Valley is precipitation falling in the high elevation area in the Boise River basin upstream of Lucky Peak Dam. Much of the runoff from high elevation areas is stored in three reservoirs: Anderson Ranch Reservoir, Arrowrock Reservoir, and Lucky Peak Reservoir.

The region’s croplands are irrigated primarily with surface water through an extensive network of reservoirs and canals. The first canals were constructed in the 1860’s; there are now over 1,100 miles of miles of major and intermediate canals in the Treasure Valley. The primary sources of the irrigation water in the Treasure Valley include the Boise, Snake, and Payette Rivers. The majority of canals are owned and maintained by canal companies and irrigation districts.

The lower Boise River sub-basin (Treasure Valley) is located within the northwest- trending topographic depression known as the western Snake River Plain. The western Snake River Plain is a relatively flat lowland separating Cretaceous granitic mountains of west-central Idaho from the granitic/volcanic Owhyee mountains in southwestern Idaho. The western Snake River Plain extends from about Twin Falls, Idaho northwestward to Vale, Oregon. The Snake River Plain is about 30 miles wide in the section containing the lower Boise River.

Sediments originating from the surrounding mountains began accumulating on top of thick, basal basalts. Rifting and continued subsidence maintained the lowland topography, leading to the additional accumulation of water and sediments (Othberg, 1994). Basin infilling by sediments and basalt occurred from the late Miocene through the late Pliocene (Othberg, 1994). Incision caused by flowing water in major drainages (e.g., Snake and Boise Rivers) began in the late Pliocene or early Pleistocene,

although deposition of coarse sediments continued during Quaternary glaciations (Othberg, 1994).

Several Quaternary basalt flows have been described in the western Snake River Plain, and have been assigned to the upper Snake River Group (Malde, 1991; Malde and Powers, 1962). Lava flowed across portions of the ancestral Snake River Valley (Malde, 1991) in an area that is now south of the Boise River. The Snake River then changed course, incising at its present location along the southern margin of the basalt flows. More recent eruptions (from Kuna Butte and other local sources) spilled lava into the canyon south of Melba. The Snake River has since incised this basalt (Malde, 1991).

The general stratigraphy of the western Snake River Plain consists of (from top to bottom) a thick layer of sedimentary deposits underlain by a thick series of basalt flows, which in turn are underlain by older, tuffaceous sediments and basalt (Malde, 1991; Clemens, 1993). The upper thick zone of sediments (up to approximately 6,000 feet thick) distinguishes the western Snake River Plain from the eastern Snake River Plain, in which the upper section is primarily Quaternary basalt (Wood and Anderson, 1981).

The uppermost sediments and basalt belong to the Pleistocene-age Snake River Group. The Snake River Group consists of terrace sediments, Quaternary alluvium, and Pleistocene basalt flows (Wood and Anderson, 1981). Snake River Group sediments and basalts cover much of the project area (Othberg and Stanford, 1992).

The Snake River Group overlies the Idaho Group sediments. The Idaho Group sediments can be divided into two general parts (Wood and Anderson, 1981). The lower Idaho Group contains sediments described as lake and stream deposits of buff white, brown, and gray sand, silt, clay, diatomite, numerous thin beds of vitric ash, and some basaltic tuffs. The upper part of the lower Idaho Group also contains some local, thin, basalt flows. The upper Idaho Group consists of sands, claystones, and siltstones, but differs from the lower Idaho Group in that it contains a greater percentage of coarser-grained materials. The upper Idaho Group are associated with a fluvial/deltaic/lacustrine depositional environment; the lower Idaho Group sediments were deposited in more of a lacustrine/deltaic environment (Wood, 1994).

Wood (1994) identified a buried lacustrine delta within the Idaho Group sediments in the Nampa-Caldwell area. The location of the delta in the middle of the western Snake River Plain suggests that the eastern part of the Boise River basin was delta plain and flood plain at the time of deposition, while the western part was a deep lake environment. The delta probably prograded northwestward into a lake basin 830 feet deep, based upon high resolution seismic reflection data and resistivity log interpretations. The delta-plain and front sediments were shown to be mostly fine-grained, well-sorted sand with thin layers of mud (Wood, 1994). The northwest trend of the delta indicates a sediment source to the southeast, such as where the Snake River flows today (Wood, 1994).

A substantial, laterally extensive layer of clay is found at depths of 300 to 700 feet below ground surface. The clay is important because it represents, in some areas, a significant aquitard separating shallow overlying aquifers from deeper zones. The clay, often described in well logs as having a blue or gray color, has been observed as far west as Parma, and as far east as Boise (although the clay is not found in the extreme eastern portions of the Treasure Valley). The clay varies from a few feet to a few hundred feet in thickness. Although significant layers of clay are present throughout the Idaho Group sediments, individual clay units are not necessarily continuous over large areas. Also, the top of the clay can vary in elevation by up to approximately 200 feet in some locations, such as in an area west of

Lake Lowell. In general, sediments above the “blue clay” are coarser-grained than the interbedded sands, silts, and clays underlying the “blue clay.”

The top of the upper Idaho Group is marked in several parts of the Treasure Valley by a widespread fluvial gravel deposit known as the Tenmile Gravels. Tenmile Gravels contain rounded granitic rocks and felsic porphyries originating from the Idaho batholith to the north and northeast. The Tenmile gravels range up to 500 feet in thickness along the Tenmile Ridge south of Boise, but are less than 50 feet thick in the Nampa-Caldwell area (Wood and Anderson, 1981).

Ground water for municipal, industrial, rural domestic, and irrigation uses in the Treasure Valley is drawn almost entirely from Snake River Group and Idaho Group aquifers. Many domestic wells draw water from shallow aquifers, such as those in the Snake River Group deposits. Larger production wells (for municipal and agricultural uses) draw water from the deeper Idaho Group sediments.

Aquifers contained in the Snake River and Idaho Group sediments comprise shallow and regional ground water flow systems. Shallow aquifers contained in Snake River Group sediments and basalts may belong to local flow systems. Most local flow system recharge stems from irrigation infiltration and channel (e.g., streams or canals) losses. Discharge from shallow, local flow systems often is to local drains or streams. The time from recharge to discharge in shallow flow systems (*residence times*) probably ranges from days to tens of years.

In contrast, regional ground water flow systems extend much deeper than local flow systems. The Treasure Valley regional flow system begins in the eastern part of the valley, as indicated by downward hydraulic gradients in the Boise Fan sediments described by (Squires et al., 1992). Some water also enters the regional flow system as underflow from the Boise Foothills in the northeastern part of the valley. The regional flow system is thought to discharge primarily to the Boise and Snake Rivers in the western and southwestern parts of the valley.

Aquifer material characteristics, material heterogeneity, and structural controls influence Treasure Valley ground water flow. Coarse-grained materials (e.g., sand and gravel) in upper zones are more capable of transmitting ground water than fine-grained sediments (e.g., silt and clay). Clay and silt in the Snake River sediments can restrict vertical and/or horizontal ground water movement. Perched aquifers are created when fine-grained lenses impede downward vertical flow. A distinctive clay layer, sometimes referred to as “blue clay,” is present over large portions of the valley. The clay is absent in the easternmost portions of the lower Boise River Basin, but can reach a thickness of more than 200 feet toward the central and western portions of the basin.

Sequences of interbedded sand, silt, and clay, such as the Deer Flat Surface and the upper portion of the Glens Ferry Formation of the upper Idaho Group in the Nampa-Caldwell area, are the major water-producing aquifers in a large part of Canyon County (Anderson and Wood, 1981). The coarse-grained sediments in this zone produce water in excess of 2,000 gallons per minute (gpm).

The source water assessment area was delineated using the WhAEM Model 2000, version 1.0.4. Specific parameters included in the model were a constant head boundary of 2493 feet above mean sea level approximately 3 miles west of the source well. The best fit hydraulic conductivity value used was 350ft/day in a 93 foot thick aquifer with a porosity of 0.2 and an annual recharge rate of 4 inches/year. The model was run with the source well pumping 11 gpm.

The delineated source water assessment areas for the Country Meadows Subdivision can best be described as a teardrop shaped capture zone that extends to the east of the source well approximately one mile (Figure 2). The actual data used by DEQ in determining the source water assessment delineation areas are available upon request.

### **Identifying Potential Sources of Contamination**

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

The dominant land use outside the Country Meadows Subdivision is irrigated cropland. Land use within the immediate area of the wellhead consists of undeveloped rangeland.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems

can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

### **Contaminant Source Inventory Process**

A contaminant inventory of the study area was conducted during April 2004. The inventory involved identifying and documenting potential contaminant sources within the Country Meadows Subdivision Source Water Assessment Area through the use of computer databases and Geographic Information System maps developed by DEQ.

Five potential contaminant sites are located within the delineated source water area (Table 1). The sources are businesses, comprised of a drilling company located within the 3-year TOT, two contracting firms, a fire equipment supply company, and an automotive repair shop that are located in the 6-year TOT Zone.

**Table 1. Country Meadows Subdivision, Potential Contaminant Inventory**

SITE #	Source Description <sup>1</sup>	TOT Zone <sup>2</sup> (years)	Source of Information	Potential Contaminants <sup>3</sup>
1	Well Drilling Company	0-3	Database Search	IOC, SOC, VOC
2	Automotive -- Repair / Paint	3-6	Database Search	IOC, SOC, VOC
3	Excavating Contractor	3-6	Database Search	IOC, SOC, VOC
4	General Contractor	3-6	Database Search	IOC, SOC, VOC
5	Fire Protection Supply	3-6	Database Search	IOC, SOC, VOC

<sup>1</sup> UST = underground storage tank, LUST = leaking underground storage tank

<sup>2</sup> TOT = time of travel (in years) for a potential contaminant to reach the wellhead

<sup>3</sup> IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

### Section 3. Susceptibility Analyses

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix A contains the susceptibility analysis worksheet. The following summaries describe the rationale for the susceptibility ranking.

#### Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity was high for the well (see Table 2). This reflects the nature of the soils being in the moderately-drained to well-drained class, having a permeable material in the vadose zone, encountering the first ground water between 56 and 102 feet below ground surface (bgs), and the lack of a 50 foot aquitard to impede the downward migration of surface contaminants.

#### Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to

contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

The Country Meadows Subdivision water system is comprised of one ground water well. The well ranked moderate in well construction susceptibility. This ranking is mainly due to the IDWR thickness requirement of the well casing not being met and the highest production zone being less than 100 feet below the static water level coupled with the upkeep of the wellhead and surface seal.

The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. Table 1 of the *Recommended Standards for Water Works* (1997) states that 8-inch steel casing requires a thickness of 0.322 inches, instead of the 0.250 inches that was used on the well. The standards state that screen will be installed and have openings based on sieve analysis of the formation. Standard 3.2.4.1 requires all PWSs to have yield and drawdown tests that last “24 hours or until stabilized drawdown has continued for six hours at 1.5 times” (Recommended Standards for Water Works, 1997) the design pumping rate.

Well #1 in the Country Meadows Subdivision system has a total depth of about 167 feet below ground surface (bgs) into a “sand/shale/some clay” layer. This well was cased with 0.250-inch thick steel casing to a depth of 152 feet bgs. A surface seal was developed out of bentonite and cement grout to a depth of 45 feet bgs into a “clay/cinders” layer. The screened interval for the well is located from 150 to 165 feet bgs. The well was developed in basalt, sand, clay, and gravel layers. At the time of development, the static water level in the well was 72 feet bgs.

### **Potential Contaminant Source and Land Use**

The wells rated moderate for IOCs (e.g. nitrates) and SOCs (e.g. pesticides). The wells rated low for microbial contaminants and VOCs (e.g. petroleum products). Irrigated agricultural land use and sources of potential contaminants in the delineated source area contributed the largest numbers of IOC points to the contaminant inventory rating. In addition, the delineation crosses an organics priority area for the pesticides atrazine and alachlor.

### **Final Susceptibility Ranking**

An IOC detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well, despite the land use of the area, because a pathway for contamination already exists. Additionally, the storage or application of any potential contaminants within 50 feet of the wellhead will lead to an automatic high score. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0- to 3-year time-of-travel zone (Zone 1B) and much agricultural land contribute greatly to the overall ranking.

In terms of total susceptibility, all of the Country Meadows Subdivision wells rated moderate susceptibility to all potential contaminant categories (Table 2).

The moderate ratings are also caused by the high hydrologic sensitivity and the predominantly agricultural land uses coupled with the moderate ratings in the other categories. Having potential contaminant sources in Zone 2 is also a contributing factor.

**Table 2. Summary of Country Meadows Subdivision Susceptibility Evaluation**

Well	Susceptibility Scores <sup>1</sup>									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
1	H	M	L	M	L	M	M	M	M	

<sup>1</sup>H = High Susceptibility, M = Moderate Susceptibility, Low Susceptibility

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

### Susceptibility Summary

No type of contamination currently threatens the Country Meadows Subdivision drinking water system. The wells also showed a moderate susceptibility to IOC contamination from local agricultural land uses, as well as VOC and SOC contamination from nearby potential contaminant sources.

### Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For Country Meadows Subdivision, drinking water protection activities should focus on maintaining the requirements of the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system’s components and its capacity). Any spills from the potential contaminant sources listed in Table 1 of this report should be carefully monitored, as should any future development in the delineated areas. Other drinking water protection activities should focus on implementation of practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the delineated source water areas. Most of the delineated areas are outside the direct jurisdiction of Country Meadows Subdivision. Partnerships with state and local agricultural agencies and industry groups should be established and are critical to success. Continued vigilance in keeping the well protected from surface flooding can also keep the potential for contamination reduced. If microbial contamination problems persist, continuous

disinfection would reduce the risk of bacteriological contamination.

Due to the time involved with the movement of ground water, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations are near urban and residential land use areas. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. There are transportation corridors near the delineations, therefore the State Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho Department of Agriculture, the Soil Conservation Commission, the Gem Soil and Water Conservation District, and the Natural Resources Conservation Service.

### **Assistance**

Public water suppliers and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Boise Regional DEQ Office                      (208) 373-0550

State DEQ Office                                      (208) 373-0502

Website: <http://www.deq.state.id.us>

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper, Idaho Rural Water Association, at 1-208-373-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

## POTENTIAL CONTAMINANT INVENTORY

### LIST OF ACRONYMS AND DEFINITIONS

**AST (Aboveground Storage Tanks)** – Sites with aboveground storage tanks.

**Business Mailing List** – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

**CERCLIS** – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund, is designed to clean up hazardous waste sites that are on the national priority list (NPL).

**Cyanide Site** – DEQ permitted and known historical sites/facilities using cyanide.

**Dairy** – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

**Deep Injection Well** – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

**Enhanced Inventory** – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

**Floodplain** – This is a coverage of the 100year floodplains.

**Group 1 Sites** – These are sites that show elevated levels of contaminants and are not within the priority one areas.

**Inorganic Priority Area** – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

**Landfill** – Areas of open and closed municipal and non-municipal landfills.

**LUST (Leaking Underground Storage Tank)** – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

**Mines and Quarries** – Mines and quarries permitted through the Idaho Department of Lands.)

**Nitrate Priority Area** – Area where greater than 25% of

wells/springs show nitrate values above 5mg/l.

**NPDES (National Pollutant Discharge Elimination System)** – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

**Organic Priority Areas** – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

**Recharge Point** – This includes active, proposed, and possible recharge sites on the Snake River Plain.

**RICRIS** – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

**SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities)** – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

**Toxic Release Inventory (TRI)** – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

**UST (Underground Storage Tank)** – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

**Wastewater Land Applications Sites** – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

**Wellheads** – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

**NOTE:** Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

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## Attachment A

### Country Meadows Subdivision Susceptibility Analysis Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

<b>Public Water System Name:</b>	Country Meadows Subdivision			
<b>Public Water System Number:</b>	3140200			
<b>Well Number:</b>	1			
<b>Date:</b>	4/1/2004			
<b>Person Conducting Assessment:</b>	Dennis Owsley			

## SWA Susceptibility Rating Sheet

### Zone IA Susceptability Rating

**Warning:** Due to specific conditions found in Zone IA this well has been assigned a **High** overall susceptability for:

**No Contaminant Categories**

*This rating is based on: (1)The presence of contaminant sources in Zone IA or (2)The detection of specific SOG/VOC chemicals in the well or (3)The detection of specific IOC chemicals above MCL levels in the well. Public Water Systems may petition IDEQ to revise susceptibility rating based on elimination of contaminant sources or other site-specific factors.*

<b>Community and Noncommunity- Nontransient Sources</b>	<b>IOC Score</b>	<b>SOC Score</b>	<b>VOC Score</b>
<i>Hydrologic Sensitivity Score =</i>	6	6	6
<i>Potential Contaminant Source/Land Use Score X 0.20 =</i>	3	2	2
<i>Source Construction Score =</i>	2	2	2
<b>Total</b>	<b>11</b>	<b>10</b>	<b>10</b>
<b>FINAL WELL RANKING</b>			
<b>IOC Ranking is Moderate (6 to 12 points)</b>			
<b>SOC Ranking is Moderate (6 to 12 points)</b>			
<b>VOC Ranking is Moderate (6 to 12 points)</b>			

<b>Microbial Susceptability Rating</b>	<b>Score</b>
<i>Hydrologic Sensitivity Score =</i>	6
<i>Potential Contaminant Source/Land Use Score X 0.375 =</i>	2
<i>Source Construction Score =</i>	2
<b>Total</b>	<b>10</b>
<b>FINAL WELL RANKING</b>	
<b>Microbial Ranking is Moderate (6 to 12 points)</b>	

Public Water System Name: Country Meadows Subdivision		Version 2.1	
Public Water System Number: 3140200		5/19/1999	
Well Number: 1			
Date: 4/1/2004			
Person Conducting Assessment: Dennis Owsley			
<b><u>Source Construction Worksheet</u></b>			
			<u>Comments</u>
(1)	Well Drill Date	Input Date February 23, 1992	
(2)	Well Drillers Log Available?	<input checked="" type="radio"/> Yes <input type="radio"/> No	If no well log is available answers to (4) and (6) are assumed to be NO and points are added to score.
(3)	Sanitary Survey Available? If Yes, for what year?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Year 2002 If no sanitary survey is available answer to Questions (5) and (8) is assumed to be NO and points are added to score.
(4)	Are current IDWR well construction standards being met?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Value 1
(5)	Is the wellhead and surface seal maintained in good condition?	<input checked="" type="radio"/> Yes <input type="radio"/> No	0
(6)	Do the casing and annular seal extend to a low permeability unit?	<input checked="" type="radio"/> Yes <input type="radio"/> No	0
(7)	Is the highest production interval of the well at least 100 feet below the static water level?	<input type="radio"/> Yes <input checked="" type="radio"/> No	1
(8)	Is the well located outside the 100 year floodplain and is it protected from surface runoff?	<input checked="" type="radio"/> Yes <input type="radio"/> No	0
<b>Source Construction Score = 2</b>			
Final Source Construction Ranking = Moderate Source Construction Score (2 to 4 points)			

<b>Zone II</b>					IOC Score	VOC Score	SOC Score	Microbial Score
(9)	Are Contaminant Sources Present in Zone II?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Complete Step 9a				
9a	What types of chemicals?	<input checked="" type="checkbox"/> IOCs	<input checked="" type="checkbox"/> VOCs		2	2	2	0
		<input checked="" type="checkbox"/> SOCs						
(10)	Are there Sources of Class II or III Leachable Contaminants in Zone II?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Complete Step 10a				
10a	What type of contaminant?	<input checked="" type="checkbox"/> IOCs	<input type="checkbox"/> VOCs		1	0	0	0
		<input type="checkbox"/> SOCs						
(11)	Pick the Best Description of the Amount and Type of Agricultural Land in Zone II.	Greater Than 50 % Non-Irrigated Agricultural Land ▼			1	1	1	0
<b>Zone II Subtotal</b>					<b>4</b>	<b>3</b>	<b>3</b>	<b>0</b>
<b>Zone III</b>					IOC Score	VOC Score	SOC Score	Microbial Score
(12)	Contaminant Sources Present in Zone III?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	Go to Step 13				
12a	What types of contaminant?	<input checked="" type="checkbox"/> IOCs	<input checked="" type="checkbox"/> VOCs		0	0	0	0
		<input checked="" type="checkbox"/> SOCs						
(13)	Are there Sources of Class II or III Leachable Contaminants in Zone III?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Complete Step 13a				
13a	What types of contaminants?	<input checked="" type="checkbox"/> IOCs	<input type="checkbox"/> VOCs		1	0	0	0
		<input type="checkbox"/> SOCs						
(14)	Is there Irrigated Agricultural Land That Occupies > 50% of Zone III?	<input checked="" type="radio"/> Yes	<input type="radio"/> No		1	1	1	0
<b>Zone III Subtotal</b>					<b>2</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>Community and Non-Community, Non-Transient System Contaminant Source/Land Use Score</b>					<b>12</b>	<b>10</b>	<b>12</b>	<b>2</b>
<b>Final Community/NC-NT System Ranking</b>					IOC Score = Moderate Contaminant/Land Use Score (11 to 20 points) VOC Score = Low Contaminant/Land Use Score (0 to 10 points) SOC Score = Moderate Contaminant/Land Use Score (11 to 20 points) Microbial Score = Low Contaminant/Land Use Score (0 to 10 points)			

<b>Zone II</b>					IOC Score	VOC Score	SOC Score	Microbial Score
(9)	Are Contaminant Sources Present in Zone II?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Complete Step 9a				
9a	What types of chemicals?	<input checked="" type="checkbox"/> IOCs	<input checked="" type="checkbox"/> VOCs		2	2	2	0
		<input checked="" type="checkbox"/> SOCs						
(10)	Are there Sources of Class II or III Leachable Contaminants in Zone II?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Complete Step 10a				
10a	What type of contaminant?	<input checked="" type="checkbox"/> IOCs	<input type="checkbox"/> VOCs		1	0	0	0
		<input type="checkbox"/> SOCs						
(11)	Pick the Best Description of the Amount and Type of Agricultural Land in Zone II.	Greater Than 50 % Non-Irrigated Agricultural Land ▼			1	1	1	0
<b>Zone II Subtotal</b>					<b>4</b>	<b>3</b>	<b>3</b>	<b>0</b>
<b>Zone III</b>					IOC Score	VOC Score	SOC Score	Microbial Score
(12)	Contaminant Sources Present in Zone III?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	Go to Step 13				
12a	What types of contaminant?	<input checked="" type="checkbox"/> IOCs	<input checked="" type="checkbox"/> VOCs		0	0	0	0
		<input checked="" type="checkbox"/> SOCs						
(13)	Are there Sources of Class II or III Leachable Contaminants in Zone III?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Complete Step 13a				
13a	What types of contaminants?	<input checked="" type="checkbox"/> IOCs	<input type="checkbox"/> VOCs		1	0	0	0
		<input type="checkbox"/> SOCs						
(14)	Is there Irrigated Agricultural Land That Occupies > 50% of Zone III?	<input checked="" type="radio"/> Yes	<input type="radio"/> No		1	1	1	0
<b>Zone III Subtotal</b>					<b>2</b>	<b>1</b>	<b>1</b>	<b>0</b>
					IOC Score	VOC Score	SOC Score	Microbial Score
<b>Community and Non-Community, Non-Transient System Contaminant Source/Land Use Score</b>					<b>14</b>	<b>12</b>	<b>12</b>	<b>4</b>
<b>Final Community/NC-NT System Ranking</b>					IOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)			
					VOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)			
					SOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)			
					Microbial Score = Low Contaminant/Land Use Score (0 to 10 points)			

<b>Public Water System Name:</b>		Country Meadows Subdivision			
<b>Public Water System Number:</b>		3140200			
<b>Well Number:</b>		1			
<b>Date:</b>		4/1/2004			
<b>Person Conducting Assessment:</b>		Dennis Owsley			
<b><u>Hydrologic Sensitivity</u></b>					
<b><u>Worksheet</u></b>					
					<u>Value</u>
(1)	Do the soils belong to drainage classes in the poorly drained through moderately well drained categories?	<input type="radio"/> Yes	<input checked="" type="radio"/> No		2
(2)	Is the vadose zone composed predominantly of gravel, fractured rock; or is unknown?	<input checked="" type="radio"/> Yes	<input type="radio"/> No		1
(3)	Is the depth to first groundwater greater than 300 feet?	<input type="radio"/> Yes	<input checked="" type="radio"/> No		1
(4)	Is an aquitard present with silt/clay or sedimentary interbeds within basalt with greater than 50 feet cumulative thickness?	<input type="radio"/> Yes	<input checked="" type="radio"/> No		2
<b>Hydrologic Sensitivity Score =</b>					<b>6</b>
<b>Final Hydrologic Sensitivity Ranking = High Hydrologic Sensitivity Score (5 to 6 points)</b>					